INTERNATIONAL STANDARD

ISO 178

Fourth edition
2001-12-15

AMENDMENT 1
2004-02-15

Plastics — Determination of flexural properties

AMENDMENT 1: Precision statement

Plastiques — Détermination des propriétés en flexion

AMENDEMENT 1: Déclaration de fidélité

Reference number
ISO 178:2001/Amd.1:2004(E)

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Published in Switzerland

Foreword

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Amendment 1 to ISO 178:2001 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

Plastics — Determination of flexural properties

AMENDMENT 1: Precision statement

Page 2, Clause 2

Correct the year of publication of ISO 3167 from 2001 to 2002.

Page 13

Replace the text of Clause 10 by the following sentence:

For precision data, see Annex B.

After Annex A, add the following new Annex B:

Annex B
(informative)

Precision statement

B.1 Tables B.1 and B.2 are based on a round-robin test performed in accordance with ASTM E 691, *Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method*. All materials were sampled and distributed by one source. Each "test result" was the average of five individual determinations. Each laboratory obtained and reported two test results for each material.

B.2 Table B.1 is based on a round robin involving nine laboratories and four materials and Table B.2 is based on a round-robin involving eleven laboratories and four materials.

NOTE The following explanations of r and R (see Clause B.3) are only intended to present a meaningful way of considering the *approximate* precision of this test method. The data in Tables B.1 and B.2 should not be rigorously applied to acceptance or rejection of material, as those data are specific to the round robin and may not be representative of other lots, conditions, materials or laboratories. Users of this test method should apply the principles of ASTM E 691 to generate data specific to their laboratory and materials, or between specific laboratories. The principles of Clause B.3 would then be valid for such data.

B.3 Concept of r and R in Tables B.1 and B.2: If s_r and s_R have been calculated from a large enough body of data, and for test results that were averages from testing five specimens for each test result, then:

a) **Repeatability:** Two test results obtained within one laboratory shall be judged not equivalent if they differ by more than the r-value for that material, r being the interval representing the critical difference between two test results for the same material, obtained by the same operator using the same equipment in the same laboratory.

b) **Reproducibility:** Two test results obtained by different laboratories shall be judged not equivalent if they differ by more than the R-value for that material, R being the interval representing the critical difference between two test results for the same material, obtained by different operators using different equipment in different laboratories.

c) The judgments in a) and b) will have an approximately 95 % (0,95) probability of being correct.

Table B.1 — Precision data for flexural stress at a conventional deflection of 3,5 % [a]

Values in megapascals

Material	Average	s_r	s_R	r	R
Polycarbonate	70,5	0,752	1,99	2,11	5,58
ABS	72,1	0,382	2,67	1,07	7,49
HDPE	20,4	0,129	0,505	0,36	1,42
GF polysulfone	156 [a]	1,65	3,13	4,62	8,75
NOTE For the meanings of the algebraic symbols used, see Table B.2.					
[a] For GF polysulfone, the flexural strength was measured.					

Table B.2 — Precision data for flexural modulus

Values in megapascals

Material	Average	s_r	s_R	r	R
Polycarbonate	2 310	45,6	146	128	410
ABS	2 470	33,6	157	94,0	439
HDPE	1 110	15,0	94,4	41,9	264
GF polysulfone	8 510	83,5	578	234	1 618

s_r = within-laboratory standard deviation

s_R = between-laboratory standard deviation

r = 95 % repeatability limit (= 2,8s_r)

R = 95 % reproducibility limit (= 2,8s_R)

ICS 83.080.01

Price based on 3 pages